

MANAGING MILKING

ON THE DAIRY

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Milking labor is a large cost on any dairy farm. Milking routine and parlor design affect the efficiency of milking and the number of cows milked per day for years after construction is completed. This publication discusses ways to improve milking efficiency, drawing largely on time-motion studies initiated by Dennis Armstrong, University of Arizona.

What's involved in milking?

To evaluate the performance of a milking parlor or the effect of a change in milking routine, one must consider each component in the milking process. Table 1 shows average times for some components of the milking process in herringbone parlors.

Table 1. Average times for milking activities.

Milking activity	Time required (second/cow)
Entrance	4–12
Wash/prep	11–28
Attachment	8–12
Idle and adjustment	4–12
Exit	1–12
Total time	35–74

As you can see, the time required for each task can vary greatly. If you can trim even one second from one task, *without increasing idle time*, you will improve cow throughput. Let's look at each component to identify ways to improve parlor performance.



General parlor design and operation

Adequate lighting in the holding pen and the entrance to the parlor is important. Cows don't like contrasting light and dark surfaces and are reluctant to walk through shadows. Keep parlors lit at 50 lumens per square foot. This will require approximately one 150-watt metal halide lamp per 150 square feet. Holding pens can be somewhat darker (20 lumens) and should not be brighter than the parlor.

Although cows adjust to the usual mechanical and musical sounds in a parlor, it's best to limit noise. Cows have been observed to enter parlors better when country-western or classical music is played regularly.

Parlor and holding pen floor surfaces should be even and provide good footing. Placing rubber mats over the concrete floor has improved

entry into the parlor by 18 percent, while reducing hoof slips by 73 percent and the number of steps taken by 4 percent.

Test parlors for stray voltage leaking from electrical services. High levels of stray voltage (16 volts) can increase milking time by a full minute per cow and make employees reluctant to handle the cows. If a cow is restless in the parlor, the employee is more likely to remove the milking machine improperly or to not use a sanitizing teat dip. Cows will not milk out completely when stressed by stray voltage.

Employees should move animals quietly and handle them patiently. Although cows may move in and out of the parlor readily when mistreated, the milk let-down response is affected, cows milk more slowly, and more milk remains in the udder after milking.

Cow entrance

Feeding grain in the milking parlor can reduce entrance time. However, if even a single cow consistently stops at a feed bowl in the middle of the parlor, this advantage is lost. The trend is to not feed grain in the parlor because high-producing cows can't consume enough grain there to meet their needs and will learn to enter the parlor readily even if grain is not fed.

The holding area affects cow entry. Holding pens should provide 12 to 15 square feet per cow for the largest group. Holding times of more than 2 hours must be avoided in today's high-producing herds. Holding cows a maximum of 1 hour per milking benefits herds milked three times daily.

Shortening the distance from the holding pen to the front milking stall can reduce entry time. Parallel parlors reduce distance by nearly half compared to a standard herringbone design. Parallels also have a wider platform and smaller gutter grates (or no gutter grates at all), both of which reduce entry time.

Cows should enter the parlor straight ahead; have them turn when exiting. The holding pen should be as open to the parlor as regulations allow, with good lighting between the pen and the parlor.

Crowd gates improve cow entry by about 10 percent and overall throughput by about 5 percent. Gates improve employee satisfaction and speed milking first-lactation cows.

The time required to open and close gates is included in entry time. Power gates, with controls at either end of the parlor, are more efficient than walking to each end to manually open or close gates. This benefit will speed cow exit as well.

Cows should learn to enter the parlor without coaxing. Often, cows enter the parlor by themselves if someone is not standing near the entrance.

When the first cow enters the parlor, the milker should follow the cow to the front and begin prepping her. Other cows will follow. Waiting for all cows to enter on a side before prepping adds to entry time and increases the time until units are attached and milking can begin. In most cases, no more time or walking is required to prep four or five cows at a time than to do an entire side at one time.

Cow washing and preparation

Dirty cows increase prep time an average of 16 seconds per cow, a potential 20 percent difference in parlor throughput. Stall and lot management is critical to parlor performance because of its effect on cow cleanliness.

Holding pen washing reduces cow cleaning in the parlor. An ideal holding pen includes a wash pen and a drip pen with a crowd gate (both sized for the group)—essentially two holding pens. For long-term udder health, cows must be dry when the machine is attached. A full-size drip pen allows cows to air dry and reduces the need for drying in the parlor. Most milking operations with pen washing and adequate drip facilities can immediately pre-dip or strip cows on entry.

Clipping or flaming the hair from udders on fresh cows makes drying udders easier and reduces mud and manure buildup on the udder. It works well with minimal discomfort to the cow. Tail switch trimming is beneficial in flush manure and parallel milking systems.

Milking time

Proper cow stimulation increases the rate of milk flow. Properly stimulated cows can milk out up to 1 minute sooner and more completely than unstimulated cows. In larger parlors, it might take some adjustments to the milking routine to stimulate cows through towel drying and to attach the milking unit within 1 minute.

Grouping cows can improve parlor flow. Segregating cows that take longer than 12 minutes to milk can improve throughput of the remaining groups by 25 percent. In larger parlors (for example, a double-50 parallel), grouping by milking speed is especially important. Size groups for the parlor. For a double-20, groups should be in increments of 20 cows (80, 100, 120, and so on) to completely fill a parlor side as the holding pen empties.

“Parlor pressure” is the idea that employees will milk as fast as necessary. A 2-hour milking creates less pressure to milk quickly than does an 8-hour shift followed by another milking crew. This is your decision. You may want cows milked and cared for completely in the parlor, rather than aiming for maximum throughput. Switching to 3X milking or adding cows to the herd will increase parlor pressure.

Unit adjustment or reattach time

The time required for adjustment and reattach depends largely on milking unit support, performance of teat cup inflations, vacuum supply, and so on. The position of the milking unit and hoses also has an effect. Parallel parlors, where the milk hose and pulsator tube pass between the rear legs, require less time for adjustment and reattach than do herringbone parlors (0.5 sec/cow compared to 1.5 sec/cow). However, machine positioning isn’t as easy in parallels. The reduction in time comes from reduced cow movement and the inability of the cows to step on the side of the unit or the milk hose.

Teat cup extenders can prevent slippage and fall-off on wide-uddered cows. The milker trades unit setup time for adjustment time,

however. Extenders are advisable for udder health and proper milking of pendulous udders.

Machine stripping of cows can add 20 percent to milking time if done on every cow. Cows must be trained to be machine stripped. If you want all your cows stripped, start today. If you don’t want to pay for this practice, which adds little to milk in the tank, tell your milking employees “hands off,” except for a problem cow or two.

Idle time

This is the time spent washing boots or hands, restocking towels, trimming a milk hose, etc. Some milkers “make” idle time. For example, they wash their hands when work is waiting to be done. Speeding up parlor performance in this case is a matter of employee management. In other cases, there really is nothing to do for a time. In this case, add milking units per employee.

Exit time

Getting cows out of a barn is less of a problem today than it was in the past, when short, narrow buildings made cows turn 180° into a narrow alley to exit. With more room in the barn for exit alleys and turning, exit time has decreased.

Feed bowl covers are helpful in barns with stationary front stalls so that cows can’t continue eating or eat small amounts out of several bowls as they walk out. Shortening the walking distance also helps, as in polygon or “pregnant” herringbone parlors.

The biggest improvement in exit time has come with rapid-exit front stalls that lift or swing completely out of the cow’s path at the end of string milking. These are gang applications of the California walk-through parlors of the late 1950s. Rapid exit will cut exit time 300 to 400 percent and overall milking time 7 to 10 percent with tight idle time.

For best performance in rapid-exit barns, make sure lighting in the exit alley is bright and uniform. Cows don’t like to cross from a well-lit parlor platform to a dark exit alley.

An exit lane of 8 feet is adequate for cows to move forward and turn toward the holding area. An alley too narrow won't allow rumps to clear the elevated front stalls; an alley too wide allows cows to stand comfortably without turning to leave the parlor.

There is always some socializing between cows in the holding pen and exit alleys. A solid fence near the front of the holding area will help cows start down the exit lane before stopping. It's impossible to eliminate all delays in the lane. The goal is to get cows started out to the point that gates can be closed and milking can resume.

A few additional thoughts

Batch or territorial milking

In a parlor with one milking employee, this method means "all in, all out." All cows enter, are prepped, and are milked as a group. In two-person parlors, one employee milks the cows in the front of the parlor and seldom helps the employee in the back "territory." Both techniques slow parlor throughput by 20 to 30 percent because entrance time and idle time increase. Avoid these practices.

Shift milking

Like workers on any job, milking employees take an hour into their shift to reach peak efficiency. Efficiency then slowly declines until about 1 hour before the end of the shift, when efficiency increases.

Parlor performance improves during an 8-hour shift if employees break for 15 minutes in the middle of the shift. In parlors with more than one milking employee, one might take a break while others continue working. However, stopping milking for all employees to break still improves cow care and parlor throughput over 8 hours. Most employees prefer straight shift milking, but the break is good personnel and cow management.

Number of people in the parlor

The economics of milking say you need to milk cows as fast as possible with the fewest number of milkers possible. If you mechanize the parlor, it should result in fewer milkers or faster cow flow.

Often we are faced with the question, "Can I milk with one less person, or should I add stalls to keep everyone busy?" Many farmers cut one milker, leaving the remaining employee(s) overloaded. Machines get dirty. Teat dipping may be haphazard. Cows are treated more roughly. This is false economy.

An alternative is to hire a roving employee who moves cows into the holding pen, washes units between exit and entry, keeps the towel racks full, milks during breaks, and runs errands throughout milking. These "rovers" can be part-time workers paid minimum wage. They can greatly improve parlor performance and cow care at little cost.

Some people work best alone; others work better together. Multiple people in the parlor can make training a new milker easier and can increase safety for employees because help is always available. However, the responsibility for milking is not clearly defined, and personality conflicts can cause problems. Make this decision based on your particular employees and the capabilities of your equipment. Larger parlors nearly always require multiple employees working as a team.

Safety

Worker safety is a growing issue. Some states already charge sizable premiums for worker compensation insurance. Design safety into milking facilities and workers' routines. Parallel parlors offer some safety advantages by reducing injuries from cows. A higher platform (about 40 inches) can reduce stress on the back and shoulders. Think safety when making changes to a high-performance parlor.

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